



H-1141

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

K. SERIZAWA et al.

Serial No. 10/825,158

Group Art Unit: 2188

Filed: April 16, 2004

Examiner: M. PADMANABHAN

For: METHOD FOR ALLOCATING STORAGE
AREA TO VIRTUAL VOLUME

**RESUBMITTED PETITION TO MAKE SPECIAL
UNDER 37 CFR §1.102(d) (MPEP §708.02(VIII))**

Mail Stop: Petition

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

June 13, 2005

Sir:

In response to the Decision on Petition to Make Special mailed April 13, 2005, dismissing the Petition to Make Special filed February 17, 2005, the Applicants re-petition.

This Resubmitted Petition incorporates by reference the February 17, 2005 Petition and provides additional details regarding claim 2 and how the claimed subject matter is patentable over the documents developed by the pre-examination search.

The Applicants have prepared this Resubmitted Petition in order to satisfy the requirements of 37 CFR 1.102(d) and MPEP §708.02 (VIII), and to address the deficiencies alleged in the Decision noted above (namely, the lack of a sufficiently

detailed discussion of the documents developed by the pre-examination search, including a detailed discussion of how the invention defined in claim 2 is distinguishable from the documents). Specifically, the Decision states that claim 2 recites an access request, but not the write request argued in the Petition. Thus, the Applicants below refer to specific language of claim 2 in accordance with the requirement, while attempting to avoid a wholesale restatement of the claim. Nevertheless, to achieve the required specificity, and due to the relative lack of correspondence between the claimed structure/functions and the listed disclosures, substantial restatement of the claim could not be entirely avoided.

(A) The fee set forth in 37 CFR §1.17(h) was previously submitted.

A Credit Card Payment Form in the amount of \$130.00 was submitted with the Petition filed February 17, 2005, in satisfaction of the fee set forth in 37 CFR §1.17(h). It is believed that this Resubmitted Petition does not require an additional fee. However, the Commissioner is hereby authorized to charge any additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

(B.) All claims are directed to a single invention

If the Office determines that all claims are not directed to a single invention, Applicants will make an election without traverse as a prerequisite to the grant of special status in conformity with established telephone restriction practice.

(C.) A pre-examination search has been conducted.

The search was directed towards a storage system. In particular, the search was directed towards a system for storing data as set forth in independent Claim 2 (independent claims 1 and 11 have been canceled without prejudice in a Preliminary Amendment that accompanies this paper) including a virtualization apparatus that allocates storage areas and converts virtual volume access requests to requests for access to the storage areas.

Claim 2 recites a system for storing data, including a virtualization apparatus coupled to a computer, and a plurality of storage devices coupled to the virtualization apparatus. Based on a request from the computer, the virtualization apparatus issues a notice to the effect that a predetermined size of a virtual volume has been allocated to

the computer. Further, upon receiving an access request issued by the computer to the virtual volume, the virtualization apparatus allocates storage areas existing in the plurality of storage devices, converts the access request to an access request addressed to a storage device having the storage areas allocated to the virtual volume, and transmits the access request to the storage device.

The search of the above features was conducted in the following areas:

<u>Class</u>	<u>Subclasses</u>
Class 711	114
	148
	170
	203

Additionally, a computer database search was conducted using the U.S. Patent and Trademark Office's Examiner Application Search Tool (EAST), and using the European Patent Office's ESPACENET database and Japanese patent database.

(D.) The following is a list of the references deemed most closely related to the subject matter encompassed by the claims:

<u>U.S. Patent Number</u>	<u>Inventor(s)</u>
6,032,224	Blumenau
6,799,245	Kochiya

<u>U.S. Patent Application Publication No.</u>	<u>Inventor(s)</u>
2002/0112113	Karpoff et al.
2002/0120822	Li et al.

<u>Foreign Patent Publication No.</u>	<u>Country</u>
2000-298556	Japan

A copy of each of these documents was submitted with the Petition filed February 17, 2005.

(E.) It is submitted that the present invention is patentable over the references for the following reasons.

It is submitted that the cited references, whether taken individually or in combination with each other, fail to teach or suggest the invention as claimed. In particular, the cited

references, at a minimum, fail to teach or suggest in combination with the other limitations recited in the claims:

a) A feature of the present invention as recited in independent Claim 2 wherein a virtualization apparatus coupled to a computer and to a plurality of storage devices issues, based on a request from the computer, a notice to the effect that a predetermined size of a virtual volume has been allocated to the computer and, upon receiving an access request issued by the computer to the virtual volume, allocates storage areas existing in the plurality of storage devices.

To the extent applicable to the present Petition, Applicants submit that although the distinguishing feature may represent a substantial portion of the claimed invention, the claimed invention including the feature provides a novel system for storing data that is neither taught nor suggested by any of the references of record.

The references considered most closely related to the claimed invention are briefly discussed below:

Blumenau, US 6,032,224 (Blumenau) discloses a hierarchical performance system for managing a plurality of storage units. In Blumenau, hierarchical performance driver 34 has an operating system device driver application

programming interface to remote storage access system 30 and a disk driver interface (DDI) to file system 32. Hierarchical performance driver 34 looks like a disk driver to file system 32, but its function is to transfer data to drivers 36-40 for local storage devices 22-26 and to transfer data to remote storage devices 16-20, and to monitor the rates of access of blocks of stored data by computer 12 in order to move blocks with faster access rates to faster storage devices and blocks with lower access rates to slower storage devices.

Blumenau, however, does not teach the use of a virtualization system which is capable of issuing a notice that a predetermined size of a virtual volume has been allocated to a computer. More particularly, Blumenau does not teach or suggest the above-described feature of the present invention in combination with the other limitations recited in independent Claim 2.

Kochiya, US 6,799,245 (Kochiya) discloses a RAID apparatus that auto-adjusts loads between real volumes despite uneven loads between logical volumes. As shown in FIG. 7, queued accesses to individual logical volumes #0 to #3 are converted to accesses to magnetic disk units (real volumes) 11-1 to 11-4 by resource manager 21 and table storage 22, which includes conversion table 22-1 shown in FIG. 8A and use-

state table 22-2 shown in FIG. 8B. The conversion table 22-1 stores, for each of the logical volumes #0-#3, the number of the real volume (magnetic disk unit) where the associated logical volume is allocated. For each logical volume, the conversion table 22-1 further stores a counter representing the multiplicity that indicates the quantity of that logical volume. The use-state table 22-2 indicates whether or not each real volume (magnetic disk unit) is in use, by means of a use flag as shown in FIG. 8B.

Kochiya, however, does not teach the use of a virtualization system which is capable of issuing a notice that a predetermined size of a virtual volume has been allocated to a computer. More particularly, Kochiya does not teach or suggest the above-described feature of the present invention in combination with the other limitations recited in independent Claim 2.

Karpoff, et al., US 2002/0112113 (Karpoff) discloses a storage virtualization system that allocates physical storage from a storage pool dynamically in response to host I/O requests, e.g., SCSI I/O requests, allowing for the amortization of storage resources through a disk subsystem while maintaining coherency amongst I/O RAID traffic. In one embodiment, the virtualization functionality is implemented in

a controller device, such as a controller card residing in a switch device or other network device, coupled to a storage system on a storage area network (SAN). The resulting virtual disk image that is observed by the host computer is larger than the amount of physical storage actually consumed.

In response to a write request, Karpoff provides a method for dynamically mapping addresses between a virtual disk address and one or more physical block addresses for a storage system. The method typically includes receiving a write request from a host, the write request including a virtual memory address and one or more blocks of data, and determining whether memory space in the storage system has been allocated for the one or more blocks of data based on the virtual memory address. If it is determined that memory space has been allocated, the method typically includes completing the write operation to the allocated memory space. If it is determined that no memory space has been allocated, the method typically includes automatically allocating memory space in the storage system for the one or more blocks of data, and completing the write operation to the allocated memory space.

Karpoff, however, does not teach the use of a virtualization system which is capable of issuing a notice that a predetermined size of a virtual volume has been

allocated to a computer. More particularly, Karpoff does not teach or suggest the above-described feature of the present invention in combination with the other limitations recited in independent Claim 2.

Li, et al., US 2002/0120822 (Li) discloses a method of memory space organization in which processor-based applications may be executed in independent devices 120-124 with respect to a central device 110. The central device 110 comprises a memory service component 115 that is capable of organizing and addressing memory portions from the first through nth devices 120-124. Applications being executed on the first through nth devices 120-124 and on the central device 110, may refer to memory spaces organized by the memory service component 115 in a symbolic addressing fashion.

The memory service component 115, which may be located in the central device 110, is capable of organizing memory locations from each of the first through nth devices 120-124, such that a single device can access a portion of memory that is larger than the memory that is available on that particular device. Therefore, utilizing the memory service component 115, an application being executed on the first device 120 may direct a write sequence that will store the data file into the second, third, and the fourth devices 121-123. In other

words, the application running in the first device 120, when executing a memory access, will "see" a 4-megabyte contiguous memory, even though that 4 megabyte memory is actually pooled from multiple locations in other devices 121-124.

By way of example, the second device 121 may initiate a write sequence which is intercepted by an address snooping agent 210 that redirects the write sequence onto the first device 120. The snooping agent 210 may be contained within the memory service component 115, and is capable of locating the address space provided by the memory service component 115, and redirecting a write sequence onto the proper target address. The address snooping agent 210 is capable of redirecting a write sequence that accesses an address space that is spread across several devices, under control of the memory service component 115, and therefore, has access to addresses that point to memory space in the multiple devices 120-124.

Li, however, does not teach the use of a virtualization system of the type claimed in Claim 2. More particularly, Li does not teach or suggest the above-described feature of the present invention in combination with the other limitations recited in independent Claim 2.

Japanese Patent Publication Laid-Open No. 2000-298556 (JP '556) discloses a disk array device having plural disk devices of respectively different capacity values. A control part 3 sets up individual divided areas obtained by dividing the disk areas of respective real disk devices by size as virtual disk devices, and establishing a disk array by using plural virtual disk devices including plural virtual devices generated on the same disk device. When read and write requests are outputted from a master device to the disk array, an address conversion part 4 refers to a disk constitution and converts the addresses of the virtual disk devices into the addresses of the real disk devices.

JP '556, however, does not teach the use of a virtualization system that is capable of issuing a notice that a predetermined size of a virtual volume has been allocated to a computer. More particularly, JP '556 does not teach or suggest the above-described feature of the present invention in combination with the other limitations recited in independent Claim 2.

(F.) Conclusion

The pre-examination search required by the MPEP "must be directed to the invention as claimed in the application for which special status is requested." MPEP §708.02 (VIII). The search performed in support of this Petition is believed to be reasonable; however, the Applicants make no representation that the search covered every search area that may contain relevant prior art. Prior art of greater relevance to the claims may exist. The Applicants urge the United States Patent and Trademark Office to conduct a complete search of the prior art, and to thoroughly examine this application in view of the prior art cited above and any other prior art that may be located in its independent search.

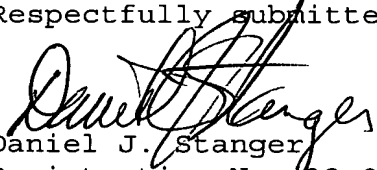
Further, while the Applicants have identified, in good faith, certain portions of each cited reference in order to satisfy the requirement for a "detailed discussion of the references, which discussion points out, with the particularly required by 37 C.F.R. §1.111(b) and (c), how the claimed subject matter is patentable over the references" (MPEP §708.02(VIII)), the United States Patent and Trademark Office should not limit review of these documents to the identified portions, but rather is urged to review and consider the entirety of each reference.

In view of the foregoing, Applicants requests that this Petition to Make Special be granted and that the application undergo the accelerated examination procedure set forth in MPEP 708.02 VIII.

(G.) Fee (37 C.F.R. 1.17(h))

A Credit Card Payment Form in the amount of \$130.00 was submitted with the Petition filed February 17, 2005, in satisfaction of the fee set forth in 37 CFR §1.17(h). It is believed that this Resubmitted Petition does not require an additional fee. However, the Commissioner is hereby authorized to charge any additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

Respectfully submitted,


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Date: June 13, 2005